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EXAMINER

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No. 09/515,675	Applicant(s) Keiji Kashima
Examiner Tarifur R. Chowdhury	Group Art Unit 2871



Responsive to communication(s) filed on _____.

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

Claim(s) 1-10 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) 1-10 is/are rejected.

Claim(s) _____ is/are objected to.

Claims _____ are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been received.

received in Application No. (Series Code/Serial Number) 09/130,462.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

-- SEE OFFICE ACTION ON THE FOLLOWING PAGES --

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DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/130,462, filed on August 07, 1998.

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

Claim 6 is objected to because of the following informalities: In line 5, a comma (,) should be added after light source. Further in line 17, a comma (,) should be added after light. Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 1 recites in lines 7-8 that, “as diffused light from the front face as a light outputting surface;” which is not clear. It is not clear how can a diffused light be outputted from the front face as a light outputting surface? The front face of the lightconductor is the light outputting surface and the diffused light is being outputted from the light outputting surface. The diffused light is not a light outputting surface. Therefore, claim 1 is vague and indefinite.

Claim 1 recites the limitations “the maximum intensity direction” and “the direction of the normal” in lines 13 and 14 respectively. There are insufficient antecedent basis for these limitations in the claim.

Claim 1 recites in line 17, “a polarized beam splitting sheet which can receive” which is not definite. The word “can” itself is indefinite.

Claim 1 further recites in lines 18, 20 and 24, “the light”. There are insufficient antecedent basis for these limitations. Since there are two kinds of light present in the claim such as “diffused light” and “polarized light”, it is not clear which light applicant is referring to in the above mentioned lines.

Claim 3 recites the limitation “the reverse rotation direction” in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation “the difference in the refractive index” in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.

In claim 6, lines 9-10, applicant recites “as diffused light from the front face as a light outputting surface,” which is not clear. It is not clear how can the diffused light be outputted from

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the front face as a light outputting surface? The front face of the lightconductor is the light outputting surface and the diffused light is being outputted from the light outputting surface. The diffused light is not a light outputting surface. Therefore, claim 6 is vague and indefinite.

Claim 6 recites the limitations "the light outputting surface side" and "the polarized beam" in lines 2 and 3 respectively. There are insufficient antecedent basis for these limitations in the claim.

Claim 6 recites the limitations "the maximum intensity direction" and "the direction of normal standing" in lines 15 and 16 respectively. There are insufficient antecedent basis for these limitations in the claim.

Claim 6 further recites in lines 18, 19, 21 and 24, "the light". There are insufficient antecedent basis for these limitations. Since there are two kinds of light present in the claim such as "diffused light" and "polarized light", it is not clear which light applicant is referring to in the above mentioned lines.

Claim 8 recites the limitation "the reverse rotation direction" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the difference" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art .

The admitted prior art , as described in page 1, line 19 - page 2, line 20 and shown in Figure 18, discloses a liquid crystal display apparatus comprising a conventional back light device.

The back light device comprising:

- a light source 3;
- a lightconductor 4 in a substantially plate form comprising a front face 4b(light outputting surface), a back face and side end face 4A;
 - light radiated from the light source 3 is made incident on the end face 4A being outputted as diffused light from the light outputting surface 4B;
 - a diffusing sheet 5 for receiving, on its face, the diffused light outputted from the light outputting surface of the lightconductor 4;
 - a prism sheet 6;
 - a liquid crystal cell 7; and
 - a light reflecting sheet 8 which is arranged on the back face of the lightconductor.

The liquid crystal cell has a structure wherein its front and back faces are sandwiched by polarizing plates 9A and 9B.

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The admitted prior art as described in page 3, lines 15-27, further discloses that when a liquid crystal cell is sandwiched by polarizing plates about 50% of incident light gets absorbed by the polarizers. Therefore, the efficiency for using light is low.

Page 4, lines 1-23 of the admitted prior art, further discloses that by employing a polarized beam splitter to separate non-polarized light from a light source into two linearly polarized light beams wherein one polarized light is outputted directly toward a liquid crystal and the other polarized light is reflected, the efficiency for using light can be improved. Therefore, it would have been obvious to one of ordinary skill in the art to substitute the polarizers for a polarizing beam splitter in Figure 18 of the admitted prior art in order to improve efficiency for using light.

Accordingly, claims 1 and 6 would have been obvious.

Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art as applied to claims 1 and 6 above and further in view of Yokota, PN 5,748,369.

The admitted prior art does not explicitly disclose that the polarized beam splitting sheet is a laminated body having 3 or more layers wherein the layers having different refractive indexes. However, Yokota evidences in column 1, lines 25-30 and shows that a conventional polarized beam splitter comprises a number of (4 in Figure 2) thin glass plates arranged parallel to one another. Even though Yokota does not explicitly disclose that the refractive indexes of the glass plates are different, for the polarized beam splitter to work the refractive indexes of the glass plates must be different. Inherently, polarized beam splitters separates light beam into P and S

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polarized light beams wherein one of the light beam is transmitted through the sheet and the other is reflected on the sheet, thereby splitting both of the polarized light beams. Accordingly, claims 2 and 7 would have been obvious.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art as applied to claims 1 and 6 above in view of Broer et al (hereinafter Broer), PN 5,793,456.

The admitted art fails to disclose that the polarized beam splitting sheet includes a circularly polarized light selecting layer comprising a cholesteric layer and a 1/4 phase differentiation layer. However, Broer discloses in column 1, lines 35-58 that by means of cholesteric polarizers it is possible to very efficiently convert unpolarized light into polarized light. Such polarizers comprise an optically active layer of a cholesteric material. If this type of polarizers is irradiated with a beam of unpolarized light the part of the light which is compatible with the (right-handed or left-handed) direction and pitch of the helix is reflected, while the remainder of the light is transmitted. By using this type of polarizer, theoretically 100% of incident unpolarized light can be converted into circularly polarized light. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ a polarized beam splitter having a cholesteric layer in the admitted prior art in order convert about 100% of the unpolarized light into circularly polarized light.

Broer does not explicitly disclose that the cholesteric polarizer further comprises a 1/4 phase differentiation plate. However, it is well known in the art that a 1/4 phase differentiation

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plate converts circularly polarized light into linearly polarized light. Therefore, it would have been obvious to one of ordinary skill in the art to further employ a 1/4 phase differentiation plate in the cholesteric polarizer of Broer in order to further convert the circularly polarized light into linearly polarized light thus obtaining maximum transmittance.

Accordingly, claims 3 and 8 would have been obvious.

Claims 1, 4, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onderkirk et al (hereinafter Onderkirk), PCT WO 95/17692 in view of Farrell, PN 5,143,433.

Onderkirk discloses in page 4, line 7 - page 5, line 13 and shows in Figure 2, an optical display 11 comprising:

- a three layer LCD assembly 15 that includes a front polarizer 18, a liquid crystal 20 and a rear polarizer 23;
- a light source 30;
- a light guide 34;
- a diffusely reflective layer 39; and
- a reflective polarizer 12.

Onderkirk fails to disclose a light diffusing sheet for receiving light outputted from the light outputting surface of the light guide. However, Farrell discloses in column 5, lines 7-11 that as a general rule, a diffuser plate is placed in the path of the backlighting rays before they reach LCD. The diffuser tends to smooth out the light intensity to aid in obtaining even intensity across

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the entire surface of the LCD. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ a diffuser for receiving light outputted from the light outputting surface of the lightconductor in order to obtain even intensity across the entire surface area of the LCD

Accordingly, claims 1 and 6 would have been obvious.

As to claims 4 and 9, Onderkirk discloses in page 5, line 26 - page 6, line 25 and shows in Figure 4 that the reflective polarizer 12 is made of alternating layers of two different materials. Therefore, it is clear from the Figure 4 that the reflective polarizer 12 which is functionally equivalent to a polarized beam splitter has a planar structure having three or more layers each of which has double refraction. Accordingly, claims 4 and 9 would have been obvious.

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art as applied to claims 1 and 6 above and in view of Heembrock, PN 5,870,156.

The admitted prior art does not explicitly disclose that the light diffusing sheet has a rougher light outputting surface. However, Heembrock discloses in column 1, lines 21-25 that a diffuser panel may be roughened to improve the uniformity of backlighting. Therefore, it would have been obvious to one of ordinary skill in the art to substitute the diffuser of the prior art with a diffuser having a rough surface in order to improve the uniformity of the backlighting.

Accordingly, claims 5 and 10 would have been obvious.

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Contact Information

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Tarifur R. Chowdhury
June 22, 2000

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